A

Synopsis of Ph.D. studies entitled:

# "Ground Water Quality Assessment of Dharmabad Tahsil Dist. Nanded Maharashtra."

*To be submitted to*

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY,

NANDED

By

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**Introduction: -**

Water covers about 75% of the earth's surface in the form of oceans, Sea, Rivers, and lakes. Oceans contain about 97% of all the water on the earth. Of the remaining water, a sizeable amount is locked in the frozen form in the Polar Regions and glaciers. Only about 1 % is available as fresh water.

Water found in rivers, lakes, streams, and wetland is known as surface water. Water that percolates into the ground is called ground water, which contain about 0.31% of the total water on earth. [1]

Groundwater is one of earth's most vital renewable and widely distributed resources as well as an important source of water supply throughout the world. The quality of water is a vital concern for mankind since it is directly linked with human welfare. In India, most of the population is dependent on groundwater as the only source of drinking water supply. [2]

Groundwater provides nearly 22% of the world' supply of fresh water. Groundwater has become as a remarkably vital freshwater reserve and its rising demand for agriculture, domestic and industrial uses rank it as of strategic importance. Worldwide approximation proved that groundwater cover 1/6 of the whole freshwater resources obtainable in the world. Numerous regions all over the world entirely depend on groundwater resources for a variety of uses. Population growth and the augment in demand for water and food supplies place a growing pressure on the groundwater quality and quantity [3]. Among one in ten still lack access to safe drinking water (WHO) ground water supplies half of drinking water in the world (UNESCO-WWAP, 2009) Ground water supplies 43%of the global consumptive use in irrigation two thirds of the ground water is abstracted in Asia (UNWWDR-2012) worlds 67% of ground water us used for irrigation, 22%for domestic purpose 11% is used for Industry [4]

But the present scenario on ground water contamination worldwide is increasingly affected by pollution that comes from industrial, scientific research, armed forces and agricultural activities either due to unawareness, lack of vision, negligence, or high cost of waste discarding and treatment, which results in pollution. Progression in industrialization, urbanization and agricultural throughout the previous few decades has deteriorated the groundwater quality.

Groundwater contamination can often have severe ill effects on human health. Environmental property values can reduce with the decline in groundwater quality along pollution belts [5]

In view of the ground contamination, increasing population and industrial as well as urban expansion, the production of wastewater and its disposal on land and water bodies has grown rapidly. Hence, regular monitoring and stringent law enforcement is required to develop a strategy to manage the environmental hazards due to wastewater pollution and to improve water quality of ground and surface water for aquatic ecosystem and disease free human population, respectively. Keeping in view the present study has been undertaken to assess the impact of urbanization and industrialization on ground water samples to assess the physico-chemical characteristics viz., Temp, PH, E.C, TDS,T.H,Ca,Mg,Na,$K^{+}$,$F^{-}$,COD,Turb,$NO_3$,$PO_4$, Heavy metals ($Cr^{+3}$,Cd,Fe,$Mn^{+2}$,$Zn^{++}$) of water samples collected from different regions of Dharmabad Dist. Nanded Maharashtra India.

Mainly two types of rocks viz Basalt and Granite are exposed in this area. The Karegaon, Pipalgaon, Salegaon, Kerkheli and, Roshangaon, and Patoda villages are in basaltic region while Belgujari, Dhanora, Ilegaon, Kerkheli and , Babulgaon villages are in granitic region which affect ground water quality

The Pioneer Alcohol Industry is situated near Dharmabad, about two km from the town. The hand pump and bore well water near the plant was affected due to discharge of effluents. Keeping all these aspects in consideration present study has been undertaken for “Ground Water Quality assessment of Dharmabad Tahsil Dist. Nanded Maharashtra.

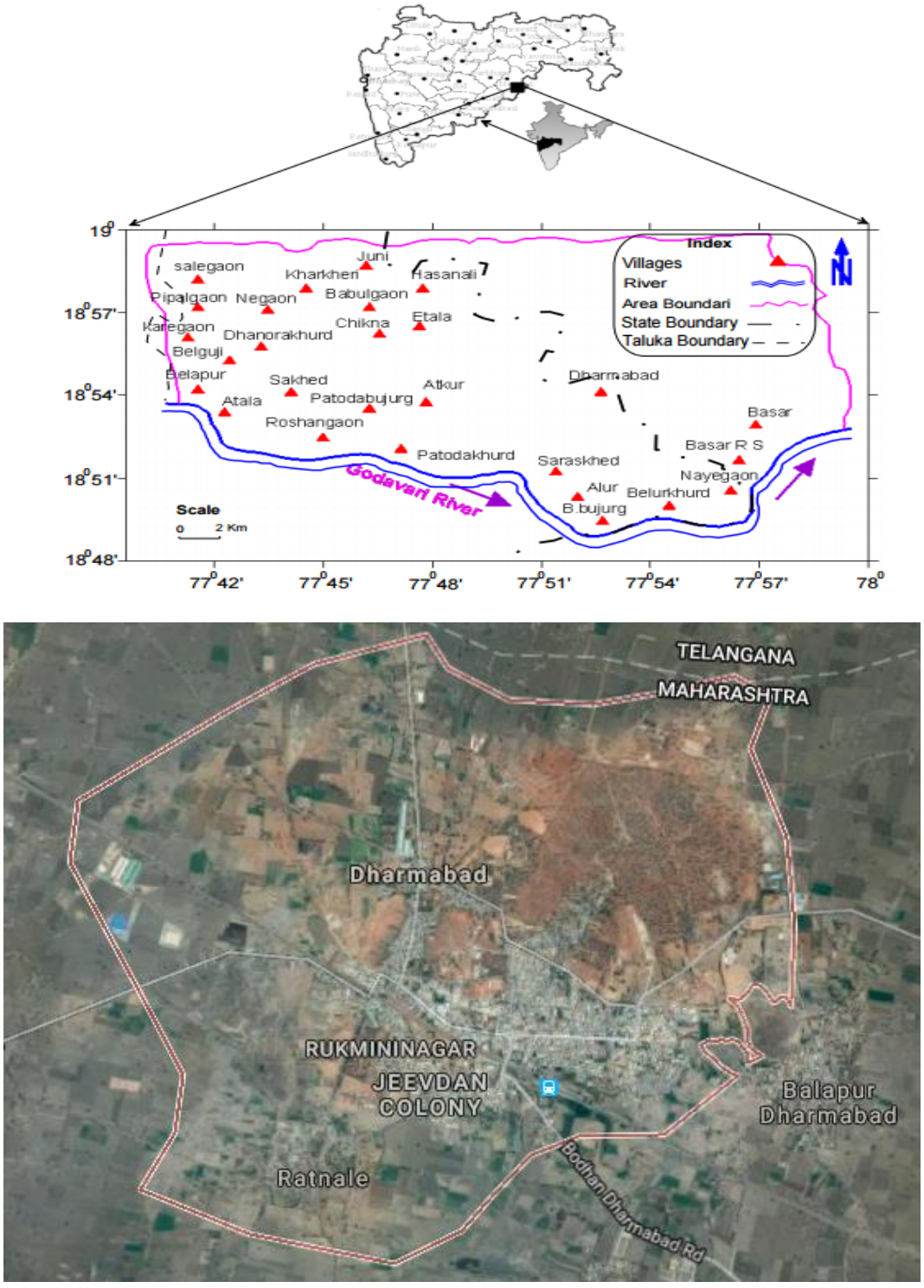
## Literature Review

T. Ramkumar, S. Venkatramanan, I. Anitha Mary, M. Tamilselvi and G. Ramesh found the ground water moderately suitable for irrigation at vedaranyam town inTamilnadu state [6]. Groundwater is important in the rural areas of the basin both for irrigation and domestic supply. Groundwater is derived from varying depths but mostly from a shallow (less than 80 ft) aquifers and a deeper aquifer (100-400ft). Concentration of As are highest in the low-lying part of the basin where condition are most reducing and groundwater flow is most sluggish.

Iron content in groundwater is also high. [7] In general ground water quality of Angul-Talcher region is not harmful to human beings. Except few instances where some parameters such as COD at Blinda, Danara and Takua Village, well water and turbidity at Blinda Village, well water were crossed prescribed limits of drinking water (IS: 10500).[8] The excess fluoride concentration in the study area may be attributed to the geological formation of that particular area and rapid ground water depletion.[9] Fluoride in basaltic aquifers was found in the range of.1 to 1.17 mg/l and in granitic aquifers, the range was.3 to 1.1 mg/l. The basaltic & granitic aquifer shows that the values are within the permissible limit. The Fluoride values are high in basaltic as compared with granitic aquifers. [10] A comparative study of ground water i.e. bore well and hand pump water carried out by taking certain important parameters like pH, TSS, TDS, TS, TA, COD, Nitrate, $Cl^-$ , $PO4^-$ , $F^-$ etc. In this present investigation it was found that the maximum parameters were not at the level of pollution except few parameters like nitrate, TDS, TSS, TS and TH in ground water. [11] Based on the analysis, most of the area at many locations near the solid waste dumping site falls in moderately polluted to severely polluted category indicating that the water is unsuitable for drinking purpose.[12] taking above reference of literature present study is undertaken.

## STUDY AREA:

**Nanded** is a city in Maharashtra state (western central India), the 8th largest urban agglomeration of the state and the 81st most populous city in India. It is also headquarters of Nanded district. The city is located on the banks of Godavari river. The entire area is covered by the Deccan Traps lava flows of Upper Cretaceous to Lower Eocene age. The lava flows are overlain by thin alluvial deposits along the Kham and Sukhana River. The basaltic lava flows belonging to the Deccan Trap is the only major geological formation occurring in Aurangabad. The lava flows are horizontal and each flow has two distinct units. The highly weathered vesicular trap and underlying weathered jointed and fractured massive trap constitutes the main water-yielding zones. The soil is mostly formed from igneous rocks and are black, medium black, shallow and calcareous types having different depths and profiles Agriculture is the main occupation of the people in rural parts of the region. Cotton, Banana, Sugarcane, Mango, soybean, Sweet lime and Jawar (sorghum) are the essential crops grown in the city's nearby area. Dharmabad is situated 80 km towards south east of Nanded district located at 18.9° North Latitude and 77.85° East Longitude and at 359 meters ( 1177 feet ) altitude above the mean sea level. Groundwater is the major source of water, used for domestic purposes. Pioneer Distilleries Limited, a subsidiary of United Spirit Limited is engaged in manufacturing of Alcohol. The factory is situated at Dharmabad of Nanded district of Maharashtra.




**FIGER 1: LOCATION MAP OF THE STUDY AREA**

**Aims and Objectives:-**

- To assess current groundwater condition
- To find out the nature and extent of ground water contamination
- To investigate the pollution by any means
- To study the scope for irrigation and other significant uses
- To generate baseline data of water quality for management strategies

## Methodology

The water samples were collected from open and boreholes in the study area. Appropriate amount of water samples will be collected polythene bottles from various wells every month covering (Post monsoon, summer, and Pre monsoon). Initially random sampling will be done as per the results final twenty four(variable as per the condition) sampling sites will be fixed . Analysis various physico-chemical and biological parameters will be done as per the standard methods of CPCB, APHA (1992), Handbook of Methods in Environmental Studies,

| **Sr.No** | **Parameter** | **Methodology adopted** |
|---|---|---|
| 01 | Temperature | Thermometric |
| 02 | pH | pH meter |
| 03 | EC | Conductivity meter |
| 04 | TDS | Evaporation |
| 05 | Total hardness | Volumetric |
| 06 | Calcium | Volumetric |
| 07 | Magnesium | Volumetric |
| 08 | Sodium | Flame photometric |
| 09 | Potassium | Flame photometric |
| 10 | Fluoride | Spands/Fluoride meter |
| 11 | Turbidity | Turbidimeter |
| 12 | Nitrate | Spectrophotomertric |
| 13 | phosphate | Spectrophotomertric |
| 14 | Chemical Oxygen Demand | Reflux Digestion |
| 15 | Heavy metals ( Chromium, Cadmium Iron and Manganese, Zinc) | Spectrophotometric/ Atomic Absorption Spectrophotmetry |

**Significance of study:**

Groundwater is almost globally important for human consumption, and changes in quality can have serious consequences. It is also important for the support of habitat and for maintaining the quality of base flow to rivers. The chemical composition of groundwater is a measure of its suitability as a source of water for human and animal consumption, irrigation, and for industrial and other purposes. It also influences ecosystem health and function, so that it is important to detect change and early warnings of change both in natural systems and resulting from pollution.

As in the study area there is distillery it has got a wide variety of effluents which affects the all physical chemical and biological parameters including heavy metals. The area is mostly dependent on the ground water for portability and if it s contaminated by the heavy metals it will affect directly or indirectly to the health of the peoples there that's why it is necessary to investigate the water quality in this area.

**WORK PLAN**

| | |
|---|---|
| FIELD STUDY | GROUND WATER QUALITY |
| START OF PH.D WORK | AFTER COMPLETION OF REGISTRATION PROCEDURE |
| STUDY TERM (STANDARD) | THREE YEARS |
| FORM OF STUDIES | FULL TIME |

**STRUCTURE OF RESEARCH WORK**

| **TIME(MONTHS)** | **WORK** |
|---|---|
| 00-06 | RIVIEW OF LITRATURE AND PREPARATION FOR EXPERIMENTAL WORK ETC |
| 06-30 | PROBING OF WATER SAMPLES AND RELATED WORK |
| 30-36 | DATA COLLECTION/STATISTICAL INTERPRETATION, THESIS WRITING AND SUBMISSION |

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